



TURBO DIESEL

REGISTER





*Product installations, evaluations,
and gearhead commentary by James Langan.*

EGR VALVE AND COOLER CLEANING

What's Required When?

Maintenance intervals to replace the closed crankcase ventilation (CCV) filter and/or clean the EGR valve and EGR cooler vary depending on what year 6.7-liter Cummins Turbo Diesel you own. My 2014 and 2017 Rams both require CCV filter replacement every 67,500 miles, and the EGR valve and cooler both require maintenance at 135,000 miles. My 2014 crew cab hit the 135k milestone on its eleventh birthday, June 2025, and the EVIC told me to *Perform Service*. This notification will reappear after every start until it is cleared.



Perform Service at 135,000 miles meant I needed to change the CCV Filter and Clean the EGR Valve and cooler.

Just Delete It?

If you post something online about emission system problems, maintenance, or repairs, invariably someone will post "*delete it!*" Would I like to delete the emissions systems on my Fourth Generation Rams? Absolutely, but not because I am looking for more power. More power is nice, but I do not find the 350hp and 660torque ratings for the Cummins in front of the G56 transmission lackluster. By any historical measure, this is a lot of torque and power, and the drivetrain does everything I need and want. While I'm not shy about running all the ponies through the stock clutch, I remain focused on proficient operation, vehicle sympathy, and longevity. It's important to remember that more power isn't free or without possible tradeoffs.

Many modern vehicles make a lot of power which can lead to shorter lifespans compared to the same drivetrain with less horsepower. Commercial Ram chassis cabs have lower ratings for just this reason, as they are intended for higher duty-cycles where longevity is more important than the peak performance of the consumer market.

Deleting Is Not an Option Here

Because I live in one of the two most populous counties in Nevada, my diesels are required to get an annual smog test before I can renew my registration. The test has a very low bar, with the same tailpipe opacity test for all light-duty diesels, including the older and relatively smoky naturally-aspirated cars and trucks. Even highly-modified trucks can pass the sniff test, but the accompanying visual inspection for *any emission system modifications* will result in an immediate failure if detected. Failing the smog test means no registration renewal. But maybe there is hope?

In late 2025, there was movement at the Federal EPA and DOT regarding automotive emissions. Maybe someday I will be able to remove these complex systems from my Fourth Generation trucks, but I'm not holding my breath.

Editor's Note: *Back in the days before emissions were the topic, the TDR had a t-shirt for all of the hot-rod/performance folks: "I am my own warranty station." Should local and national oversight do a 180° change, I can see that statement being relevant again.*

Context

This article and the nearly step-by-step, how-to section were written about performing the service on a 2013 to 2018 engine. Different generations of the 6.7-liter engine ('07.5-'12; '13-'18; '19-'24 and the '25-newer) and chassis cabs may vary. However, the job should be similar for these trucks. The process is not difficult, just time consuming because of the amount of parts that need to be removed, cleaned, dried, and then reinstalled.

I postponed the simple yet time-consuming project until I had a few consecutive days without other obligations. It was few days before Christmas 2025, and the odometer had climbed to 142,000 miles. Adding 4% for odometer error from taller tires, the actual mileage was about 147,700. That is nearly 9.5% beyond the recommended interval, and darn close to 150,000 miles when the engine also needs its first valve adjustment. Would I find a terribly clogged and gooey EGR system or other issues from waiting so long? The answers are in the how-to section of this article, the photos, and the captions.

Let's Get Started: Time Estimate

Magazine article projects always take much longer than simply attacking maintenance to *get 'er done*. Taking my time while documenting the process with copious notes and photographs, I allowed myself a few half days while working at a leisurely pace. For the average shadetree mechanic who doesn't hit any snags and is not rushing, my rough time estimate is: two or three hours to remove the parts, one hour for initial cleaning before soaking overnight, then a few hours for the rinsing, drying, and reassembly process.

Visual Example from Motor City Mechanic

My parts kit was purchased from Geno's Garage, and I dutifully read the included instructions a couple times before diving in. However, much credit goes to Motor City Mechanic's YouTube channel, and his three-part series about removing and cleaning the EGR valve and cooler. It's an older video featuring an early 6.7-liter Fourth Generation ('10-'12 year model), but still relevant and it was extremely helpful to see much of the process in video format. Here's a link to his first of his three-part series. <https://youtu.be/kGotr1QMwCA?si=CIltz9LffyGXmPlz>

Longevity

For diesels, even in pickups, my minimum longevity expectation is 350,000 miles. This is with me doing the driving and routine services, because how we use and maintain things can make all the difference. TDR members get it: Maintenance practices matter, though *doing* is different than *understanding*. However, I think that not nearly as many fully grasp what it takes to operate machinery proficiently, or they simply don't want to put in the effort. Need examples?

No Load And Idling

This should not be a news flash, but needless or excessive idling is suboptimal for nearly all engines, particularly on modern diesels with their complex emissions systems that are designed for *loaded* operation. Excessive light load operation can lead to harmful deposits.

Editor's note: I cringe when I see local police cars, tow trucks or ambulances that have to sit at idle. Contacts at Cummins and Ram tell me that idle conditions gum-up the air intake and also play havoc with the hydraulic lifters used on '19 and newer 6.7-liter engines.

Loading does not necessarily require pulling trailers or hauling something in the bed, as just the truck itself is often enough if operated at appropriate engine and road speeds. Higher rpm idling is still idling, and doesn't add load, the truck needs to be driven. Want to see this for yourself? Watch your boost gauge and/or the engine load percentage on your Edge CTS while running your engine at a high rpm when *idling*, not driving. There is no boost or indicated load.

City or urban driving usually involves lower speeds and much more idling than rural highway or steady freeway travel due to sitting at red lights. One or two minutes sitting at traffic signals doesn't matter much, but after 10 or 12 red lights those minutes add up. Repeated urban driving or stop-and-go commuting will add hours of less efficient, low load operation to an engine, but light-load use can be balanced with steady highway driving and loading. What is your average speed for all the miles on your truck (higher is better)? Odometer miles divided by total engine hours will give you the answer.

Make Them Work For A Living

What does all this mean? It means don't be afraid to work your truck but keep an eye on the vital signs by frequently reading the gauges. The factory gauges can be enough, but auxiliary instruments can provide helpful additional information. Frequently monitoring the engine coolant temperature, EGT, boost, load percentage (and transmission temperature if available), and appropriately balancing the readings should influence speed, gear choice, accelerator pedal position, etc. Higher rpm in a lower gear will often increase coolant temperature and fuel consumption but can reduce EGT and transmission loading, and that is sometimes a beneficial trade-off. The old expression *rode hard and put away wet* still has value. It's better to let everything continue circulating and cool a few minutes after stopping before shutting off your engine.

EGR Active Regeneration Frequency

Compared to the frequency of active regeneration cycles I see others writing about online, I have comparatively infrequent active regens. Fewer active regens indicate that the combustion is good, the exhaust is staying hot enough for passive regenerations to keep things clean and flowing. After noting this disparity, recently I started logging active regens. The last three active regens occurred after 1,400 miles, 2,800 miles, and 2,400 miles, an average of every 2,200 miles. These infrequent regenerations, combined with the appearance of my EGR plumbing after almost 150,000 miles, signal efficient operation. (Yep, here is a picture, but let's finish the story.) I don't mind taking credit, but I think my manual transmission is helping.



Seeing the inside of the EGR valve assembly was just as reassuring as looking into the EGR cooler. There was no grimy mess, just signs of normal exhaust gases.

Are Diesel Aftertreatment Systems Always Troublesome?

There are always horror stories, but it doesn't seem like a high percentage of Turbo Diesel owners are having a lot of emissions related hassles, but maybe I am not reading internet forums enough to know? The Cummins aftertreatment hardware hasn't changed much since DEF's introduction in 2010 chassis cabs, then 2013 in pickups, so things should be dialed, but seemingly similar generation engines/trucks can have substantial differences. **Editor's note: Since 2007.5, my estimate for 6.7-liter engines to Ram: Over 2,250,000 engines. Are you surprised we don't hear about an abundance of problems?**

Is Diesel Exhaust Fluid the Worst Thing Ever?

Before buying my 2014 Crew Cab I was against having a truck that required diesel exhaust fluid. My thinking was that the previous generation truck was simpler because it didn't need DEF, even though they had more aggressive EGR. Was that correct? Is needing diesel exhaust fluid worse than the more aggressive EGR that potentially pollutes the oil faster and reduces oil change intervals? Maybe, or maybe not. Certainly there are numerous pickups running around using both pre-DEF and post-DEF systems, and plenty of owners who would curse either version. It's logical to argue that DEF injection systems add yet another layer of complexity, there are more parts that can fail, and I certainly don't love adding exhaust fluid. However, other than my example that follows, the DEF system on my 2014 is still working fine.

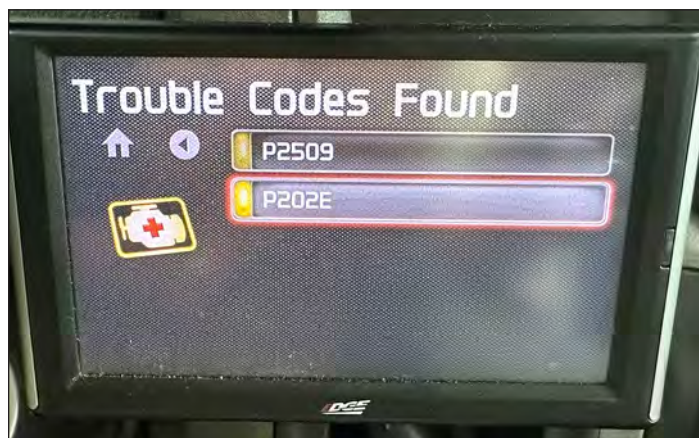
Note to all TDR members:

*This excellent article by James Langan
will be added to the TDR's
Perfect Collection, Volume II
in the 30+ page area
"DEF/SCR Topics."*

*From all of the TDR writers to you –
we hope you find the PC books helpful
when you encounter a problem
with your truck!*

P202E Code, DEF Injector

February 2024, at 110,000 miles, code P202E appeared on my 2014 Turbo Diesel. P202E is for *Reductant Injector Circuit Range/Performance* and usually means the DEF injector is bad and needs to be cleaned or replaced. I drove to my local Cummins Rocky Mountain dealer, but apparently the DEF injector for Rams is not available from Cummins. Napa Auto Parts had their Echlin DEF300 in-stock locally, and there was a 20% discount for ordering online (even with in-store pickup) making it \$200. The same part today, exactly two years later, retails for \$346, and with the same 20% online discount it's now \$277. (I purchased a second DEF injector for my 2017 from Geno's Garage.)



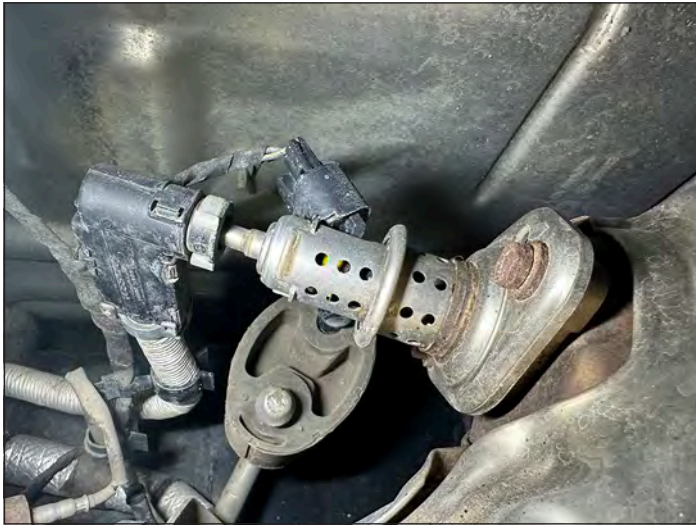
P202E is for Reductant Injector Circuit Range/Performance. Often the DEF injector is bad. **Editor's note: Or the injector is "dirty" and just needs cleaning. See our book The Perfect Collection, Volume II, pages 192-218, specifically "Clean the DEF Injector."**



New DEF Injector from NAPA, \$200 after coupon, February 2024.

Clean and Reuse?

With my NAPA replacement part in-hand, I sprayed penetrating oil on the injector bolts in preparation of doing the parts swap before the truck went into limp mode or whatever happens when the DEF injector completely fails, but it never happened. After clearing codes and buying the new injector I waited for the gremlin to return. Two years and 34,000 miles later I am still running the factory DEF injector, the code hasn't resurfaced and there have been no related concerns since.



I was prepared to replace the original injector, but it stopped throwing codes and it continues to work.

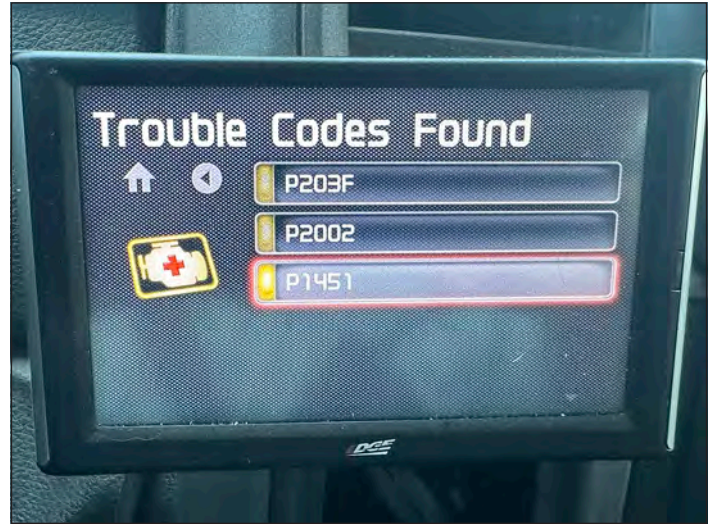
Was there never truly a problem and just a silly code? Did the deposit prevention additives in the Peak DEF Platinum exhaust fluid actually clean the injector? Who knows, but as the decades fly by, I've become better at not fixing what isn't broken. The pickup runs well so I keep driving as it is. **Editor's note: I, too, have seen the P202E code. I added DEF to the tank, cleared the code with my "Edge Monitor" and it has not reappeared. Checking with the "AI Guy" he points to: A bad injector and "urgent emissions systems fault." Further investigation will reveal a thread at the TDR's website (thanks, Guys!) where members discuss that cold weather can trip the code as the DEF heater struggles to keep things warm. Heat 'er up, reset the code, drive on. AI information: Trust but verify.**

Additionally, there is a variety of DEF/SCR topics that are found in the Perfect Collection, Volume II, pages 192-218. In those 26 pages we cover principle of operation typical trouble codes; injector cleaning; DEF pump and DEF sensor repair and replacement.

Yes! Additionally, there is a variety of DEF/SCR topics that are found in the Perfect Collection, Volume II.

Exhaust Filter 100% Full

At 133,000 miles, May 2025, this EVIC warning popped up: *Exhaust System Regeneration in Process Exhaust Filter 100% Full*. This was combined with codes on my Edge Monitor, CTS2:
P203F – Redundant Level Sensor Too Low. (The DEF tank level and fluid were fine.)
P2002P – Diesel Particulate Filter Efficiency Below Threshold.
P1451 – Diesel Particulate Filter System Performance.



The Edge Monitor shows the fault codes.

My response was to keep rockin' down the highway at 75mph. Over the next 10 minutes the EVIC warning dropped to 90% Full, 80% Full, and eventually *Exhaust System Regeneration Completed*. This was the first time I had seen an *Exhaust Filter Full* warning on my dash. My Edge CTS2 cleared the codes and there's been no reoccurrence for the last nine months and 12,000 miles.



Exhaust filter was full, but after a bit of freeway driving: "Exhaust System Regeneration Completed" was my reward.

Wash the Engine First

It's nicer to work on a clean vehicle, in this case the engine, and it can prevent grit getting where it doesn't belong. My method is just rinsing with a garden hose, followed by enough driving and drying time before the work commences.

Again, I recommend Motor City Mechanic's three-part video series on cleaning the EGR valve and cooler for a good baseline understanding of the project. My how-to photographs and captions provide details and close-ups of the parts the fasteners involved and should help the shadetree DIY Turbo Diesel mechanic.

How-To



Remove dipstick and four 8 mm bolts securing the U-shaped cover at the front of the engine/valve cover. The EGR valve and electric controller is the T-shaped piece next to the oil dipstick and forward of the brake master cylinder. The EGR cooler is on the passenger side of the valve cover and mostly hidden by parts needing to be removed to access the cooler.



One of two wiring connections on the airbox lid, both should be disconnected before removal.



Loosen three screws and the clamp to lift the airbox lid and intake tubes that feed the turbocharger. I chose to separate the top section of tubing from the lower. It may be more efficient to keep everything connected, because joining the two sections of intake and securing the clamp during reassembly was "fiddly."



Even with a good garden hose rinse the day before, separating the two large rubber intake tubes to the turbocharger resulted in some grit falling into the top of the lower tube. It was easy to wipe clean.



The turbocharger's cold side looked good to me.



A red shop rag protects the turbocharger intake.



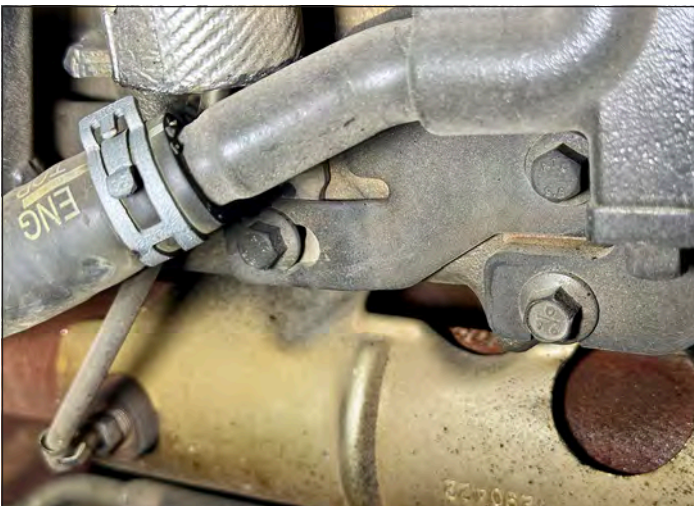
Unclip these two connectors and move the wiring out of the way.



Four bolts secure the EGR control valve assembly bracket to the exhaust manifold. These two, vertical 10 mm bolts are next to the passenger side of the valve cover.



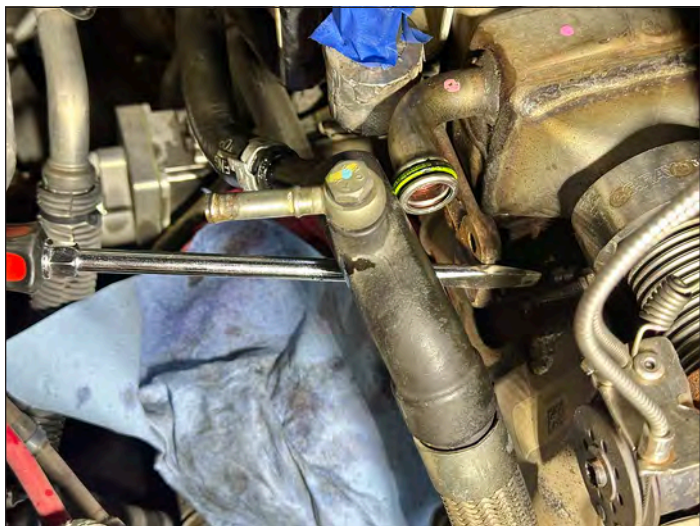
After all four bolts are out, rotate the control valve and bracket toward the valve cover. I held mine out of the way with a bungee cord. There is a spring that might fight you a little.



The other two control valve bracket, 10 mm bolts run horizontally just above the exhaust manifold, one at 9 o'clock and one at 2 o'clock. At 3 o'clock a third 10 mm, slightly longer bolt secures a different bracket for a steel-braided coolant pipe.



Showing the first of two hoses running over the top of the EGR cooler removed. To disconnect the slightly rearward and partially steel braided hose still attached here, the wiring harness connector and bracket attached the CCV filter/valve cover needed to be disconnected.



Pulling this hose off the front of the EGR cooler was difficult, I could not do it with hand strength alone. I pulled back with my right hand while also prying with a screwdriver just below the EGR cooler. A hose that connects to the coolant bottle attaches to the fitting on top that points left in this photo.



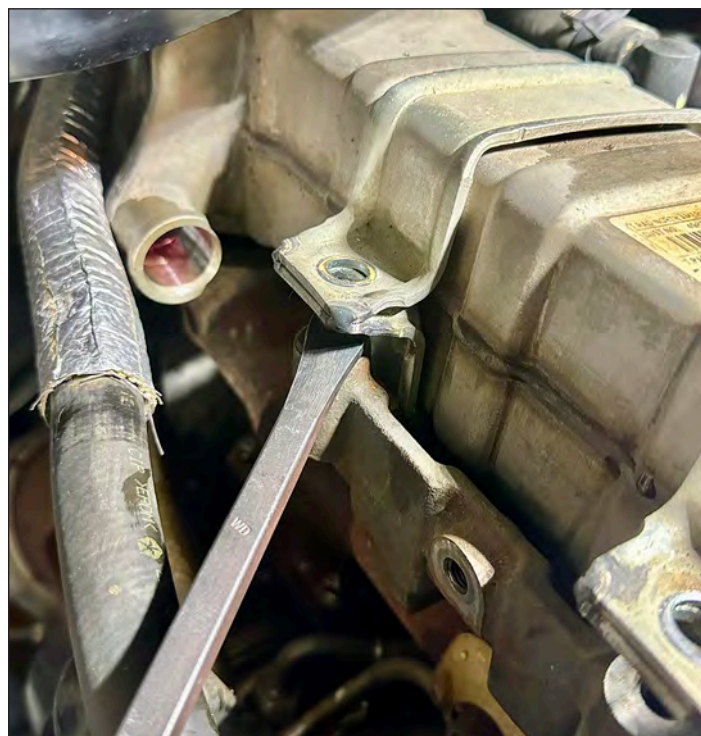
A 11 mm nut on this V-band clamp secures a crossover tube from the EGR valve on the driver side, to the front of the EGR cooler on the passenger side. Loosen the nut enough to disconnect the T-shaped end, then spread the clamp apart and remove the clamp.



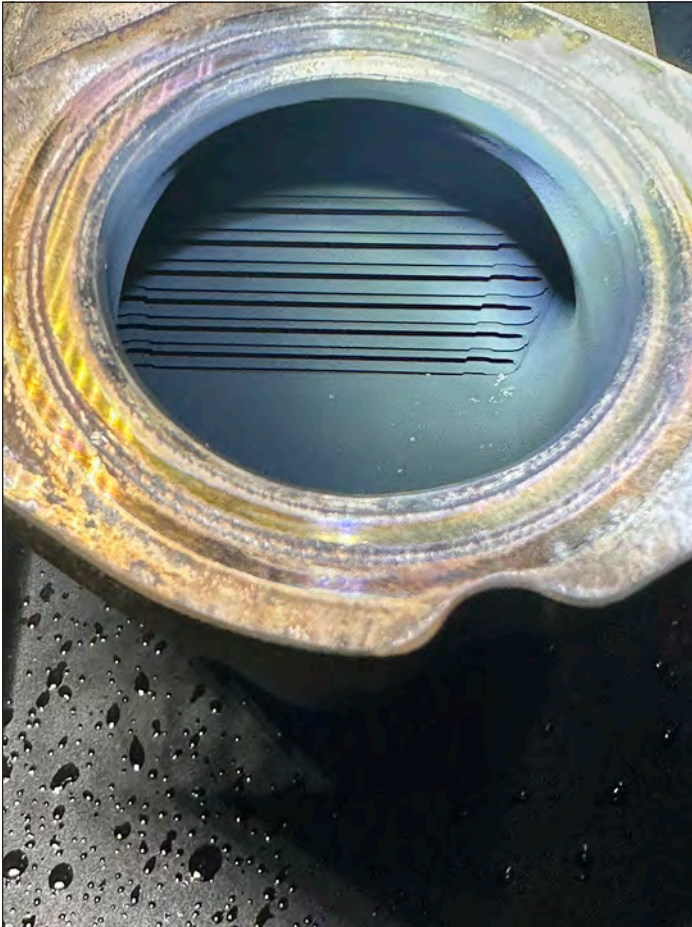
Long ratchet to the rescue.

The rear of the EGR cooler sits on two studs secured by 15 mm nuts, and this is the most knuckle busting part of the job. A long-handled ratchet would be helpful, but with my long arms I was able to use a regular ratchet to loosen the nuts, which were not very tight. The length of your deep socket, extension, and ratchet is important, and for me 5 3/8-inches overall worked well. This allowed dropping the socket onto the 15 mm nut, with the ratchet handle pivoting just above the top of the EGR cooler.

Automatic transmission trucks will also have a dipstick tube bracket to disconnect.



With all the fasteners and hoses disconnected, a gentle pry of the center bracket confirmed the cooler was loose and ready for removal. The rear needs to be lifted off the two studs, moved rearward a bit away from the crossover pipe at the front of the cooler, then up and out toward the front.



Peering into the rear of the EGR cooler. This was the first time I had done any EGR system maintenance, but compared to some of the horror stories I'd read online, mine looked great. There was bit of black carbon, but it was thin and dry, and there was no drippy, oily, or goeey mess. The front inlet looked similar.



Seeing the inside of the EGR valve assembly was just as reassuring as looking into the EGR cooler. There was no grimy mess, just signs of normal exhaust gases.



The crossover tube that routes EGR gases from the driver's side to the cooler on the passenger side also only had a thin layer of carbon inside. With no apparent slime or restriction, I decided against removing and cleaning this tube. Only the EGR cooler and EGR valve were cleaned.



After removing the V-band clamp on the front, the EGR valve (already off in this photo), the four 10mm bolts securing the EGR to the manifold, and the wiring harness clip, the EGR valve can be lifted off the engine.



Four Phillips screws hold the EGR's electronic controller to the assembly. Remove before cleaning the EGR valve.



A spring-loaded part of the EGR valve sits behind the electronic controller. As recommended by Motor City Mechanic, stuffing a rag into one of the ports prevents the spring from compressing to facilitate disassembly.



Two half-moon clips at the top of the shaft hold a spring under this cylindrical top piece. Push down on the cylindrical piece with your fingers and/or a screwdriver enough to release and then pop-out the clips to disassemble. Now the cleaning can begin.



Before using any solvent, just running hot water through the EGR cooler released this nasty black crud. The inside of the cooler didn't look bad to the naked eye, but obviously there was junk inside.



Purple Power to the rescue.

Purple Power cleaner/degreaser was purchased specifically for this project due to the recommendation from Geno's Garage, which was based on the testing conducted by [Truck Trend](#) magazine back in 2016. Before adding the Purple Power to the cooler, I used water to measure how much I would need. The EGR cooler took about 1/2-gallon, maybe slightly less, and one-half gallon was used to soak the EGR valve and housing. I bought two gallons, only needed one, but the extra might've been helpful had I cleaned more parts.



EGR Cleaning Kit

Contents of Geno's Garage EGR Cleaning Kit, without the crankcase vent filter, #EGRKIT-2, \$62. I actually purchased and used the kit with the crankcase filter, #EGRKIT-1, \$176. The first things used were the two rubber plugs (supplied by Geno's in the kit) at the bottom right of the photo, allowing for the cooler full of Purple Power to soak overnight.



Time for internal cleaning. Note the cooler "plugs" from Geno's Garage.

With the larger plug wedged into the larger bottom hole of the cooler, it was filled with full-strength Purple Power. Purple Power is a little soapy/bubbly and foamed out of the smaller top hole when it was close to full. Stirring and breaking the bubbles with my finger allowed more to be added until the cooler was as full as possible. After fitting the smaller plug, the cooler soaked upside down overnight. In the morning, I propped it on its side with a screwdriver, and later upside down for a few hours before finally rinsing with water.



After 16 hours of soaking, this is what the Purple Power looked like coming out of the EGR cooler!



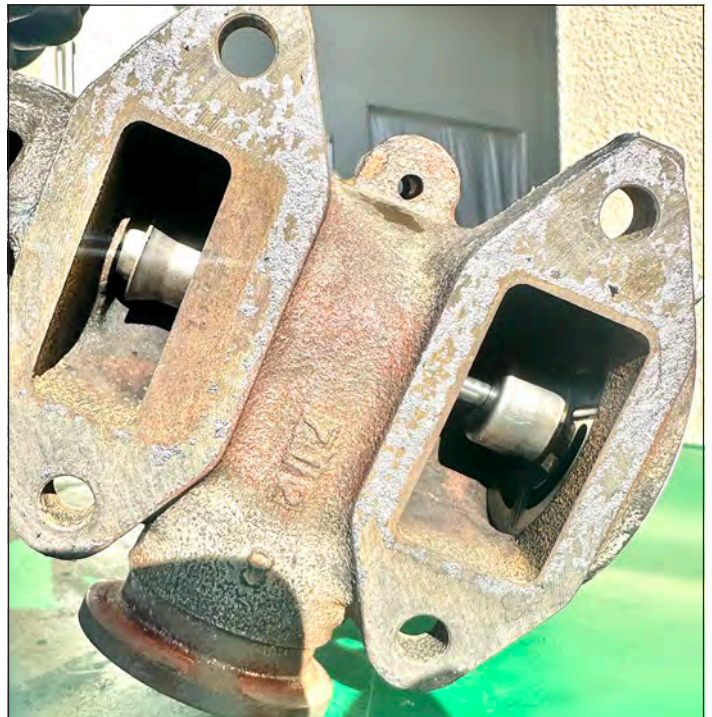
The cooler was rinsed with hot water numerous times, including shaking it with the plugs in-place, until the water came out looking as clean as it went in. Blow compressed air through the cooler to dry it out.



This is a 1,000-word photo regarding the effectiveness of Purple Power. Could the inside of the cooler look any better? Great



Gallon coolant bottle with one side cutout was used to soak the EGR valve overnight.

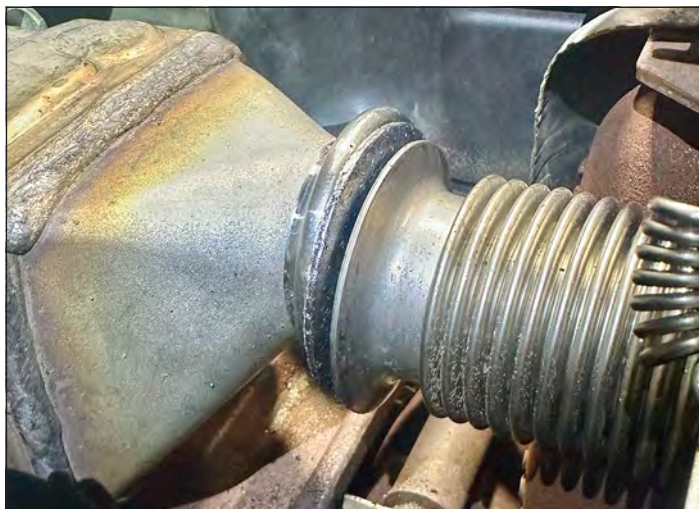


An old toothbrush helped clean the round end of the EGR housing output that goes to the crossover tube and feeds the EGR cooler. Again, Purple Power worked extremely well!

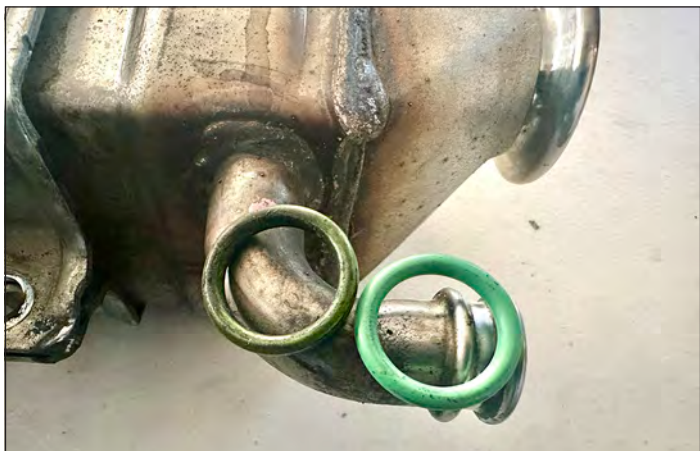
Reassembly



New metal gasket on the two studs for the rear of the EGR cooler before reassembly.



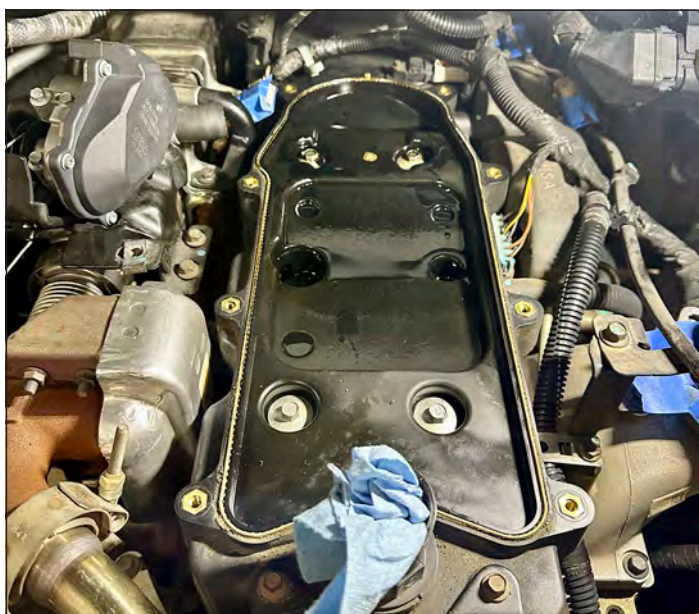
A new gasket was placed between the front of the EGR cooler and the crossover pipe, which are mated by a V-band clamp.



The OE spring-type hose clamp here gave me grief during reinstallation, so it was replaced with a common worm-gear clamp.



The Geno's Garage parts kit included three new green O-rings. One goes on the end of the elbow-shaped coolant port on the front of the EGR cooler, a second is for the hose with the steel-braided center that crosses over the cooler, and the third is for a hard fitting that sits between the cooler and the valve cover/CCV.



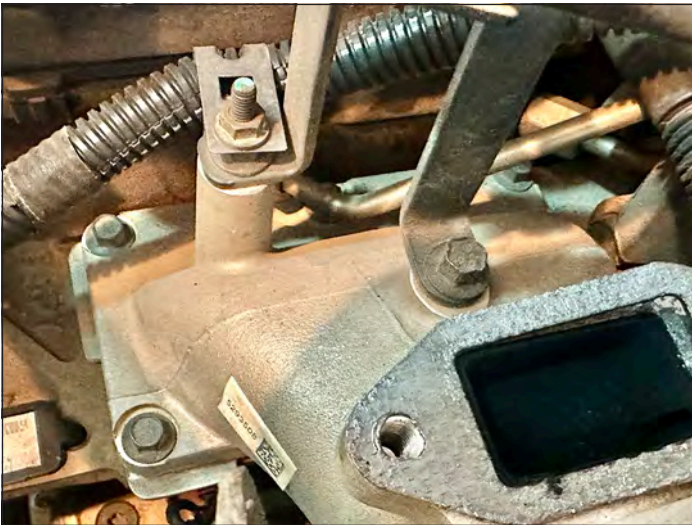
CCV/valve cover removed as well as the used filter.



Old CCV filter on the left, new filter on the right.



Ready to reinstall the cleaned EGR valve.



This intake horn was not pulled or cleaned, just the EGR and EGR cooler.



Gaskets below the EGR valve lifted easily, and only a little gentle scraping and chemical cleaning was needed before reassembly.



Just one-half quart (measured) of coolant was lost and caught by this pan.



Back together and finished.

The truck started normally, there were no leaks, and a shakedown test drive was uneventful.

I was curious to see if there was a way to use my Autel scan tool or the Edge Monitor CTS2 to clear the Perform Service EVIC reminder... if there was, I didn't find it. Additionally, while Perform Service is mentioned in both the printed owner's manual and CD that came with my truck, I could not locate the actual procedure explained, but maybe I missed it. What did work was the procedure detailed in the Geno's Garage instructions, but only if I did the key-on and pedal presses dance *before* the Perform Service reminder was illuminated.

What's Next

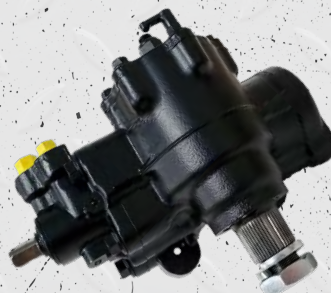
Removing my EGR valve and EGR cooler for cleaning thousands of miles past the recommended interval and seeing that they were just mildly sooty, dry, and not caked with any type of oily slime (looked like a good spark plug) was extremely encouraging. It appears that the EGR is not creating problems for my 2014, at least not yet. **Editor's note: No problems for James' EGR system thanks to his use of the diesel engine to do diesel things. His truck is not a "grocery getter."** If the EGR system stays on the truck, barring any hassles forcing additional maintenance, I don't plan another cleaning until 300,000 miles.

Drive diesel and tell 'em you read it in the TDR!

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